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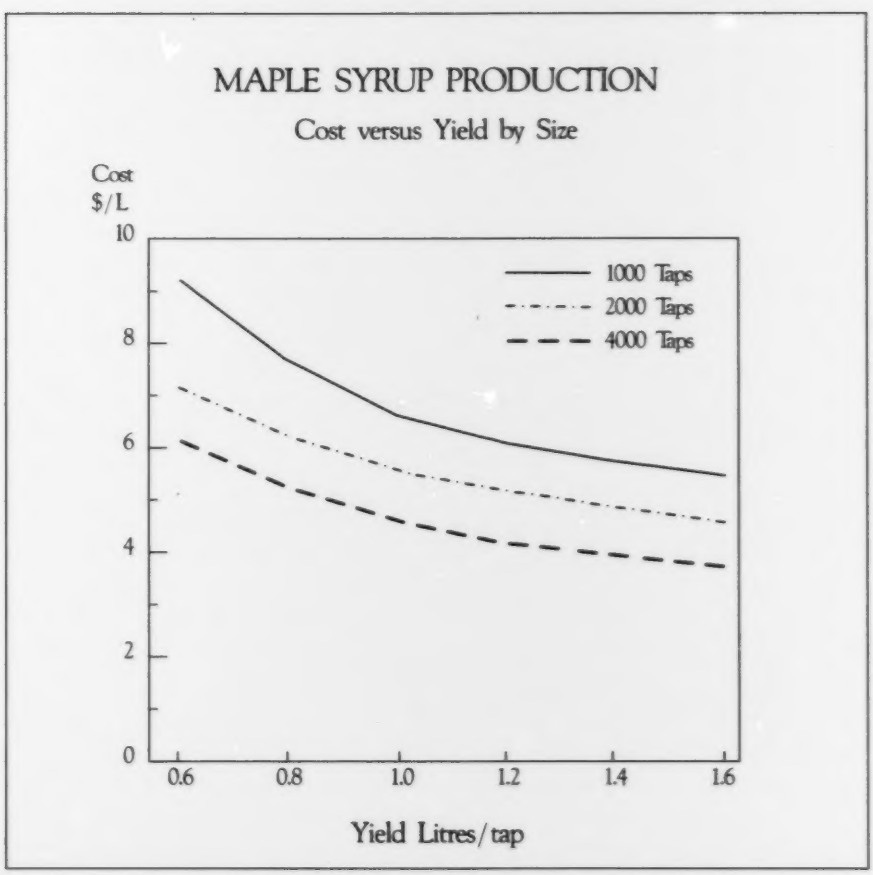
MAPLE SYRUP PRODUCTION COSTS IN ONTARIO



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ECONOMICS INFORMATION
REPORT NO. 88-02

MAPLE SYRUP PRODUCTION COSTS IN ONTARIO

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SUMMARY

An increasing need for up to date information on the economics of maple syrup production led to a production cost study, which was carried out in 1987. Data for this study were obtained by means of consensus meetings of producers, OMAF commodity specialists and OMAF economists.

Cost items were organized into operating, overhead and annual ownership costs. Operating and overhead costs were based on actual data obtained from the cooperating producers. Ownership costs of equipment and buildings used in syrup production were based on the 1987 purchase costs of new assets. Cost of production estimates were developed for three different sizes of maple syrup operations, namely 1,000 taps, 2,000 taps and 4,000 taps. A yield of 1 litre per tap was used in each of the cost estimates.

The study results can be summarized in the following four statements:

1. At current maple syrup price levels and under the cost structures developed in this study all three operations generated revenues greater than production costs.

2. At a price of $9.00 per litre, each of the three operations generated sufficient revenues to cover all operating, overhead and ownership costs and provide the operator with a return per hour of labour, conducive to continuous or increased production.

3. Economies of scale were apparent. At a yield of 1 litre per tap, the total costs per litre were $6.79, $5.52 and $4.61 respectively for 1,000, 2,000 and 4,000 tap operations.

4. Production costs are sensitive to variations in yield per tap. This confirms the need for adequate sugar bush management to enhance the ability to obtain above average yields.

I. INTRODUCTION

The maple syrup industry is unique to the northeastern part of the North American continent. Canada and the U.S. are the only two producing countries. Canada supplies about 60 percent of the total maple syrup production. Canadian syrup is produced in Quebec (92.5%), Ontario (6%), Nova Scotia (1%) and New Brunswick (0.5%). Maple syrup operations in Quebec and New Brunswick, with an average of about 2,000 taps per farm are larger than the average Ontario operation, which has only slightly more than 500 taps per farm (Table 1). Only a small portion of Ontario's tappable maple trees, estimated at less than 10 percent, is used for production of syrup and other products derived from syrup.

The total number of maple taps on Ontario farms reported in the 1986 Census was 876,000, down 4 percent from the 916,000 taps reported in the 1981 Census. The number of farms reporting taps, however, went from 2,897 in 1981 to 1,649 in 1986, a decrease of 43 percent. The largest decrease in the number of farms occurred in the category with less than 100 taps per farm (Table 2). The total number of taps in the size groups 100 to 2,000 taps per farm remained approximately the same between 1981 and 1986. These farms account for nearly 600,000 taps or two-thirds of the provincial total.

Ontario's production of maple syrup was over one million litres per year in 1966, 1967 and 1968, but then decreased to a low of 468,000 litres in 1980. Between 1980 and 1985 the industry again saw an increase to almost a million litres in 1985. Both 1986 and 1987 were poor harvest years and only slightly over a half a million litres were produced in 1987 (Table 3).

During recent years demand for maple syrup has outpaced supply and the selling price has increased accordingly. The average price received per litre by Ontario producers in 1987 was $7.51, compared with a five-year average of $5.49 during the 1982-1986 period.

Canadian production and farm value of maple products and maple syrup by province is shown in Tables 4 and 5. Retail sale prices for syrup sold directly by producers to consumers in 1987 were considerably above the $7.51 per litre level.

In Ontario, an estimated 90 percent of maple syrup production is sold in retail containers by producers at the farm. About 6 percent is sold in bulk to the wholesale industry and bulk processors, while the remaining 4 percent is used on home farms. Approximately one-third of Ontario consumption is produced in Ontario, the balance coming from Quebec.

In Quebec, 30 percent of the syrup is sold directly to consumers, 66 percent is sold to the wholesale industry, and 4 percent is used at the farm (Figure 1).

In Ontario, retail prices are determined by producers on the basis of individual supply and demand and accessibility to markets. In Quebec, the Maple Sugar Producers' Cooperative of Quebec, which represents 4,000 producers, determines the price and negotiates with the wholesale industry to establish a price structure.

Exports of maple syrup and maple sugar from Canada and from Ontario for the period 1971-1986 are shown in Table 6. In 1986, the total value of all maple products produced in Ontario was $4 million. Ontario exports of maple products in 1986 amounted to $7.5 million for syrup and $4.2 million for maple sugar. The difference between the values of Ontario production and exports reflects the substantial amounts of maple syrup coming into Ontario from Quebec.

The Ontario Maple Syrup Producers' Association was formed in 1966. The Association's objectives are to help producers become more aware of the economic factors affecting the industry.

II. STUDY BACKGROUND

There has been an increasing need for current cost of production information and budget data by producers, potential producers, researchers, extension personnel and others involved in the maple syrup industry in Ontario. The last Ontario study on the cost of production of maple syrup was done for the 1978 production season.

Data for the 1987 study was obtained by means of consensus meetings of producers, OMAF commodity specialists and economists. During the 1987 production season a group of producers recorded detailed information, by means of a survey questionnaire, on their production system, operations performed and physical inputs required in syrup production. During meetings held after the end of the season, the various input items were discussed and a consensus was reached on a set of data to be used in arriving at relevant cost of production estimates.

In some cases the data were supplemented by information available from other sources as well. If possible, data from the producers' consensus were confirmed by comparisons with other data sources.

III. METHODS AND PROCEDURES

In this report the technology used in the 1,000 tap and the 2,000 tap operation is referred to as conventional processing, while the technology used in the 4,000 tap operation is referred to as reverse osmosis or "R.O." processing.

Cost items were organized into operating, overhead and annual ownership costs. Operating costs include fuel, containers, cleaners and filters, family and hired labour, repairs, and interest on operating capital.

Overhead costs include utilities, insurance, advertising, association fees and other overhead items contributable to the maple syrup operation. Ownership costs are the annual costs of owning syrup equipment and buildings to house the evaporating equipment and to store products held for sale. Also included is a charge for tree ownership.

The following section describes how each input item was treated.

Fuel

In the cost estimates the following basic assumptions regarding fuel requirements were used:

- Conventional processing:

	1 cord of wood to produce	70 litres of syrup
or	4 litres of oil to produce	1 litre of syrup

- Reverse osmosis:

	1 cord of wood to produce	227 litres of syrup
or	1.25 litres of oil to produce	1 litre of syrup

An additional cost of propane for finishing was $0.06 per litre of syrup.

All fuel expenditures for wood, whether purchased or supplied from the owner's woodlot were valued at the market value of $75.00 per cord, which was consistent with the range of prices reported by the producers.

Labour

Cooperating producers kept records on the use of labour for sap collection, processing and marketing of the 1987 crop. Although labour use varied considerably between farms, a consensus of labour use could be reached without great difficulty. The labour requirements used as a basis for the production cost estimates in this report are shown in Table 7.

Family and hired labour for the purpose of this report is valued at $6.00 per hour. Determining the value of farmer operator labour always presents a problem and the maple syrup cost study was no exception to this rule. No clear consensus on the value of operator labour was reached by the study participants. Consequently, operator labour has not been included as an input cost, but rather has been treated as a residual return above all other costs. Only in one place in this report has a value been put on operator labour, namely in the comparison of costs with a study carried out in 1978. For the purpose of this comparison a value of $7.00 per hour was used for operator labour (Table 17). This value is comparable with the value of $4.00 per hour, which was used in the 1978 study, when statistical information on farm labour inflation is taken into account.

Repairs

Building repairs are based on 2 percent of the building investment cost and equipment repairs are based on 3 percent of the investment in maple sap collection and syrup processing equipment. The resulting cost values are consistent with those reported by the cooperating producers. Cooperators who owned reverse osmosis equipment reached a consensus on an estimated annual repair cost, which reflected both current and future repair and maintenance costs of recently purchased R.O. equipment.

Other Operating Costs

Cost estimates for containers, cleaners, filters and miscellaneous operating costs are based on weighted averages of cost data recorded by the cooperators.

Interest on operating capital is calculated at a rate of 10 percent for a four month period on all operating costs.

Overhead Costs

The main overhead items were hydro and telephone, insurance, travel and advertising. Cost estimates are based on actual costs incurred by the cooperating producers.

Ownership Costs

Investment levels in syrup equipment and buildings were determined, based on 1987 prices, for new equipment and materials. Table 8 shows the actual dollar values used for the assets included in each of the three cost estimates.

From these investment costs, an annual ownership charge was calculated by amortizing the amount of investment over an appropriate period of asset life expectancy. Taking into consideration the relative durability of the various assets as well as the probability of a continuation of changes in technology, an amortization term of 15 years was selected.

Over the next 15 years, both the price of syrup and the cost of syrup equipment can be expected to increase because of inflation. In order to offset these two factors the real interest rate was used in amortizing the investments over the 15 year term. The real interest rate in March 1987 was 6.3 percent.

The amortization procedure is shown below:

Size of Operation	Investment	Amort. Factor	Annual Cost
1,000 taps	$23,275	.10678	$2,485.30
2,000 taps	29,465	.10678	3,146.27
4,000 taps	53,680	.10678	5,731.95

This study did not attempt to determine the actual ownership cost of the woodlot. Ownership costs would include items such as the amount of investment in real estate, municipal taxes, proceeds from woodlot products other than maple syrup, cost of woodlot maintenance, loss in timber value caused by the maple syrup operation, and other possible tangible and intangible cost items.

The assumption made in this study is that the maple syrup producer already owns the woodlot and merely utilizes an opportunity to generate additional net income. Those readers who are using the results of this study to make decisions about a woodlot purchase for the purpose of producing maple syrup need to carry out an additional assessment of woodlot ownership and woodlot management costs.

As a substitute for assessing woodlot ownership costs, this study recognizes a rental charge per tap of 30 cents per year. This charge was agreed upon by consensus and is representative of what is paid by operators who actually rent woodlots from other owners.

IV. PRODUCTION COSTS IN ONTARIO

Production cost estimates for maple syrup operations were developed at three levels of production, namely:

1. A 1,000 tap operation, using a tubing system of sap collection and a 36" x 10' evaporator with preheater hood and a finisher.

2. A 2,000 tap operation, using the same basic technology, but with a 48" x 14' evaporator.

3. A 4,000 tap operation using a 40" x 12' evaporator and a reverse osmosis installation.

The syrup yield in all three operations was held constant at 1 litre per tap.

The major resources required in maple syrup production are a productive woodlot, sap collection equipment, evaporating equipment, a suitable building, as well as the labour supply and management ability to produce a quality product.

Operations start in late winter with the installation of sap collection equipment. The cost estimates used in this report are based on sap collection equipment that consists of plastic tubing and a vacuum system. In addition to the labour for installation, labour is also used for repair and maintenance, cleaning, removal and storage of the tubing at the end of the season.

In early spring when temperatures vary between below 0°C at night and 5°C during the day, sap begins to flow and the evaporation process begins and continues for a period of three to six weeks, depending on the season. During the evaporation process water is removed from the sap by boiling until the desired sugar solids content is reached. It takes between 30 and 40 litres of sap to produce one litre of syrup. A further processing step takes place during the finishing stage after which the product is graded and packaged. Some producers engage into further processing of syrup to manufacture derivatives such as taffy, sugar and maple butter. These secondary processes are not considered in this report.

Fuel used in the evaporating process is one of the major operating cost items. Attempts to reduce the cost of the evaporating process have resulted in improved technology, such as the closed evaporator and the reverse osmosis machine. Both of these technologies reduce labour and energy input costs.

Reverse osmosis technology removes more than half of the water from the sap before it reaches the evaporator, resulting in savings in fuel and labour used in the evaporating process. Based on the consensus of cooperating producers, the fuel cost for reverse osmosis operations was 41 cents per litre of syrup, compared with $1.21 per litre for operations that used conventional processing technology (Tables 9, 10 and 11).

Processing labour use amounted to 72 hours per 1,000 taps for R.O. operations, compared with 122 hours for conventional operations. Tables 9, 10 and 11 show the costs per operation and per litre for 1,000 tap, 2,000 tap and 4,000 tap operations. Total operating costs per litre were $3.08, $2.85 and $2.21 respectively for the three sizes of operation. The 20 cents per litre difference in operating costs between the 1,000 tap and the 2,000 tap size is mainly because of the difference in repair costs. Although the 2,000 tap operation had a larger investment in buildings and equipment than the 1,000 tap operation, the investment per 1,000 taps was relatively lower for the 2,000 tap size. Consequently, the repair costs per litre were lower for the 2,000 tap operation.

The 4,000 tap operation had a lower operating cost per litre than either the 1,000 or the 2,000 tap size, mainly because of lower fuel costs. This advantage was partly offset by a higher cost for hired labour, due to the larger volume of syrup produced and the additional repair and maintenance of the R.O. equipment.

Total overhead costs were 92 cents per litre for 1,000 taps, 77 cents for 2,000 taps and 67 cents for 4,000 taps. The cost difference can be attributed to economies of scale, which exist when larger volumes of production cause lower per unit costs, in spite of the fact that the overhead per operation is higher for the larger sizes of operation.

The same principle is true for the annual cost of owning the buildings and syrup equipment. The amortization costs of the investment in buildings and equipment were $2,485, $3,146 and $5,731 for 1,000, 2,000 and 4,000 taps; the ownership costs per litre were $2.49, $1.57 and $1.43 respectively. The tap rental charge, however, was constant at 30 cents per litre for all three operations.

Total costs per litre, excluding a charge for operator labour and management were $6.79 per litre for 1,000 taps, $5.49 for 2,000 taps and $4.61 for 4,000 taps (Tables 9-11). Operator labour hours used were 205 hours, 400 hours and 500 hours respectively for 1,000, 2,000 and 4,000 taps (Table 7).

Cost comparisons between the three sizes of operation are shown in Tables 12 and 13. The cost comparison on a per litre basis (Table 13) clearly shows the cost advantage that exists at the higher levels of production. The assumption is made, of course, that all three operations had the same yield per tap, which is at the one litre level.

Since operator labour and management have been treated in this report as residual returns to the operator, a further analysis was made of the return to the operator per hour of labour contributed to maple syrup production. The returns per hour of operator labour were calculated for a range of selling prices for each of the three operations.

In each case, a management fee equal to 5 percent of the gross sales was added to the production cost. the net return per operation, which is the sales revenue minus total cost, was then divided by the number of operator labour hours. The results are shown in Table 15.

At a selling price of $8.00 per litre, all three operations had a positive return per hour of labour. At $7.00, the 1,000 tap operation did not return a positive return to operator labour. At $5.00 per litre the 4,000 tap operation still had a $1.09 per hour positive return per hour of operator labour, while both the 1,000 tap and the 2,000 tap operation showed a considerable loss position (Table 15). The total returns per operation to operator labour and management are shown in Table 14.

A further analysis was made to determine the relationship between yield per tap and total production costs per litre. Table 16 shows the cost per litre for the 1,000 tap operation at yield levels for the range of yields from 600 litres to 1,600 litres at 200 litre increments. The cost per litre was $9.26 at 600 litres per operation and decreased dramatically to $5.40 per litre for a yield level of 1,600 litres. This relationship is graphically illustrated in Figure 2.

The analysis supports the belief that improved production practices and prudent sugar bush management, which lead to higher yields, will result in lower production costs.

Finally, the results of the 1987 study were compared to a production cost study carried out by the Economics Branch of the Ontario Ministry of Agriculture and Food in 1978.

The 2,000 tap operation in the 1987 study was used in the comparison, since this size of operation and the technology used, match most closely those of the 1978 study. The results are shown in Table 17. The total cost per litre in 1978 was $3.89. Using a comparable operator labour rate, the total cost in 1987 was $6.89, an increase of 77 percent over the 1978 cost. The average selling price per litre during the same period increased by 128 percent, based on statistics shown in Table 3.

**Table 1:--Maple Syrup Production, Canada,
Average Number of Taps per Farm, Producing Provinces, 1986**

	No. of Farms	No. of Taps	Average/ Farm
Quebec	7,419	14,440,966	1,942
Ontario	1,649	876,588	532
New Brunswick	118	251,780	2,134
Nova Scotia	83	x	x
P.E.I.	7	x	x
Canada	9,276	15,699,068	1,692

x confidential.
Source: Census of Agriculture, 1986.

**Table 2:--Maple Syrup Production, Ontario
Farms Reporting Maple Tappings by Size of Operation, Ontario, 1981, 1986**

Size of Operation # of taps	No. of Farms Reporting		No. of Maple Taps	
	1981	1986	1981	1986
1 - 100	1,718	608	65,744	29,103
101 - 500	700	553	183,442	154,484
501 - 1000	248	242	190,266	185,423
1001 - 2000	158	171	228,255	244,795
2001 - 3000	44	35	115,410	85,250
3001 - 4000	19	23	68,800	80,223
4001 - 5000	4	8	18,100	37,600
5001 - 7000	3	7	19,800	43,510
7001 and over	3	2	26,000	16,200
TOTAL	2,897	1,649	915,817	876,588

Source: Census of Agriculture, 1981, 1986.

Table 3:--Production and Farm Value of Maple Products, Ontario, 1965-1987

Year	Maple Syrup			Maple Sugar			Total Farm Value of Maple Syrup and Maple Sugar
	Production	Farm Value per litre	Farm Value Total	Production	Farm Value per kg	Farm Value Total	
	kilolitres	$	$'000	tonnes	$	$'000	$'000
1987	523	7.51	3,927	12.7	12.00	153	4,080
1986	602	6.04	3,638	14.5	10.80	156	3,794
1985	991	5.65	5,600	11.8	10.20	120	5,720
1984	827	5.42	4,485	8.6	10.00	86	4,571
1983	714	5.18	3,696	8.2	8.80	72	3,768
1982	768	5.18	3,978	21.3	9.50	203	4,181
1981	650	4.83	3,141	5.9	8.60	51	3,192
1980	468	4.32	2,020	3.6	6.70	24	2,044
1979	814	3.62	2,949	8.2	6.70	55	3,004
1978	650	3.29	2,138	5.4	5.90	32	2,170
1977	664	3.10	2,056	4.1	5.90	24	2,080
1976	605	2.88	1,741	6.4	5.20	33	1,774
1975	546	2.63	1,437	4.1	4.90	20	1,457
1974	646	2.30	1,486	7.3	3.80	28	1,514
1973	564	1.96	1,103	5.4	3.90	21	1,124
1972	818	1.70	1,388	6.4	3.00	19	1,407
1971	673	1.58	1,060	6.8	2.65	18	1,078
1970	827	1.50	1,243	7.7	2.59	20	1,263
1969	868	1.47	1,279	3.6	2.48	9	1,288
1968	1,036	1.38	1,435	5.0	2.41	12	1,447
1967	1,018	1.34	1,365	6.4	2.20	14	1,379
1966	1,418	1.29	1,832	8.2	1.96	16	1,848
1965	850	1.23	1,047	4.5	1.76	8	1,055
1964	705	1.19	837	3.6	1.65	6	843
1963	996	1.15	1,141	3.6	1.65	6	1,147
5-Year Average							
1983-1987	731.4	5.84	4,269	11.2			
1978-1982	670.0	4.25	2,845	8.9			
1973-1977	605.0	2.59	1,565	5.5			
1968-1972	844.4	1.52	1,281	5.9			
1963-1967	997.4	1.25	1,244	5.3			

Source: Statistics Canada, Catalogue No. 22-204.

Table 4:--Production and Farm Value of Maple Products, Canada, 1981-1986

	1981	1982	1983	1984	1985	1986
			- kilolitres -			
Quebec	13,458	7,786	8,270	7,273	9,200	9,275
Ontario	655	791	718	836	1,003	616
New Brunswick	50	36	50	55	48	116
Nova Scotia	58	54	65	77	68	62
Canada	**14,221**	**8,667**	**9,103**	**8,241**	**10,319**	**10,069**
			- $'000 -			
Quebec	38,830	23,438	24,608	24,211	39,423	58,094
Ontario	3,192	4,181	3,768	4,571	5,720	3,794
New Brunswick	238	181	271	354	291	777
Nova Scotia	329	340	418	507	458	444
Canada	**42,589**	**28,140**	**29,065**	**29,643**	**45,892**	**63,109**

Source: Statistics Canada, Catalogue No. 22-204.

Table 5:--Production and Farm Value of Maple Syrup, Canada, 1981-1986

	1981	1982	1983	1984	1985	1986
			- kilolitres -			
Quebec	12,918	7,321	7,765	6,916	8,789	9,010
Ontario	650	768	714	827	991	602
New Brunswick	36	23	36	41	41	98
Nova Scotia	44	41	50	59	49	51
Canada	**13,648**	**8,153**	**8,565**	**7,843**	**9,870**	**9,761**
			- $'000 -			
Quebec	35,996	20,893	21,666	22,031	36,632	55,906
Ontario	3,141	3,978	3,696	4,485	5,600	3,638
New Brunswick	129	109	191	237	231	609
Nova Scotia	231	239	334	365	332	324
Canada	**39,527**	**25,219**	**25,887**	**27,118**	**42,795**	**60,477**

Source: Statistics Canada, Catalogue No. 22-204.

Table 6:--Canadian and Ontario Exports of Maple Syrup and Maple Sugar, 1971-1986

Year	Canada		Ontario	
Maple Syrup	kilolitres	$'000	kilolitres	$'000
1971	2,419	3,455	766	1,314
1972	2,980	5,136	934	1,873
1973	3,191	5,669	893	1,802
1974	2,958	5,346	1,000	2,049
1975	2,529	4,581	1,039	2,160
1976	3,374	6,295	858	2,079
1977	3,716	7,899	992	2,754
1978	3,342	9,478	627	2,646
1979	5,553	12,743	800	3,696
1980	4,049	13,420	824	4,329
1981	4,442	15,995	756	4,095
1982	4,528	17,720	965	4,364
1983	4,732	18,696	684	3,626
1984	4,761	21,633	689	4,320
1985	5,720	29,989	835	5,977
1986	6,891	50,557	795	7,558
Maple Sugar	'000 tonnes		'000 tonnes	
1971	2,039	2,346	494	732
1972	1,196	2,833	400	765
1973	974	1,672	429	829
1974	672	1,185	298	604
1975	758	1,219	128	255
1976	918	1,548	105	223
1977	809	1,753	335	915
1978	628	1,638	167	599
1979	648	2,262	261	1,175
1980	648	1,977	105	409
1981	556	1,794	0	0
1982	460	1,438	7	39
1983	713	2,293	115	495
1984	609	2,110	168	741
1985	306	1,720	169	1,168
1986	610	4,752	455	4,197

Figure 1

DISTRIBUTION OF MAPLE SYRUP FROM PRODUCER TO CONSUMER IN ONTARIO AND QUEBEC

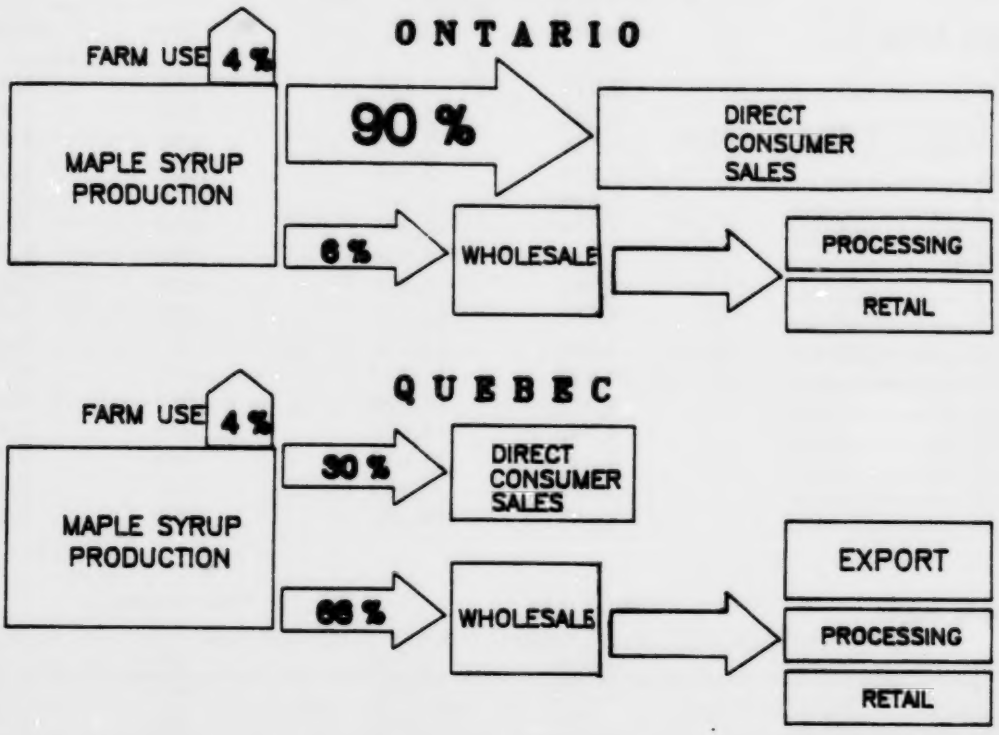


Table 7:--Labour Requirements for Maple Syrup Production, Ontario, 1987

	Operator	Family	Hired	Total
		- hours/1,000 taps -		
Sap Collection	70	17	43	130
Processing - Conventional	121		1	122
R.O.	43	20	9	72
Marketing	13	12		25
Total Conventional	204	29	44	277
Total R.O.	126	49	52	227

Table 8:--Building and Equipment Investment (new cost) for Maple Syrup Production, Ontario, 1987

Investment	Cost
	- dollars -
1,000 Tap Operation	
Sap collection equipment	7,425
Evaporating equipment	6,850
36" x 10' evaporator	
pre-heater hood	
finisher	
Sugar house	6,500
Electrical service and wiring	2,500
Total	23,275
2,000 Tap Operation	
Sap collection equipment	11,150
Evaporating equipment	8,315
48" x 14' evaporator	
pre-heater hood	
finisher	
Sugar house	7,500
Electrical service and wiring	2,500
Total	29,465
4,000 Tap Operation	
Sap collection equipment	19,100
Evaporator 40" x 12' with pre-heater	6,240
R.O. machine 150 gallon/hour capacity	16,840
Sugar house	8,500
Electrical service and wiring	3,000
Total	53,680

Table 9:--Maple Syrup Production Costs for 1,000 Tap Operation, Ontario, 1987

Conventional Processing	Per Operation	Per Litre of Syrup
1,000 Taps, producing 1,000 Litres	- dollars -	
Operating Costs:		
Fuel	1,210	1.21
Containers	650	0.65
Cleaners & Filters	50	0.05
Miscellaneous	20	0.02
Total	1,930	1.93
Family and Hired Labour (73 hrs. @ $6/hr.)	438	0.44
Repairs - Building	180	0.18
- Equipment	428	0.43
Interest on Operating Capital (4 mos. @ 10%)	99	0.10
Total Operating Costs	**3,075**	**3.08**
Overhead Costs:		
Hydro and Telephone	300	0.30
Insurance	233	0.23
Travel	145	0.14
Advertising	138	0.14
Association Fees	20	0.02
Miscellaneous	90	0.09
Total Overhead Costs	**926**	**0.92**
Ownership Costs:		
Amortization of Syrup Equipment (6.3%-15 yrs.)	2,485	2.49
Tap Rental	300	0.30
Total Ownership Costs	**2,785**	**2.79**
TOTAL COSTS (excluding operator labour and management)	**6,786**	**6.79**

Table 10:--Maple Syrup Production Costs for 2,000 Tap Operation, Ontario, 1987

Conventional Processing	Per Operation	Per Litre of Syrup
2,000 Taps, producing 2,000 Litres	- dollars -	
Operating Costs:		
Fuel	2,420	1.21
Containers	1,300	0.65
Cleaners & Filters	100	0.05
Miscellaneous	40	0.02
Total	3,860	1.93
Family and Hired Labour (144 hrs. @ $6/hr.)	864	0.43
Repairs - Building	200	0.10
- Equipment	584	0.29
Interest on Operating Capital (4 mos. @ 10%)	186	0.10
Total Operating Costs	5,694	2.85
Overhead Costs:		
Hydro and Telephone	500	0.25
Insurance	295	0.15
Travel	260	0.13
Advertising	276	0.14
Association Fees	20	0.01
Miscellaneous	180	0.09
Total Overhead Costs	1,531	0.77
Ownership Costs:		
Amortization of Syrup Equipment (6.3%-15 yrs.)	3,146	1.57
Tap Rental	600	0.30
Total Ownership Costs	3,746	1.87
TOTAL COSTS (excluding operator labour and management)	10,971	5.49

Table 11:--Maple Syrup Production Costs for 4,000 Tap Operation, Ontario, 1987

Reverse Osmosis Processing	Per Operation	Per Litre of Syrup
4,000 Taps, producing 4,000 Litres	- dollars -	
Operating Costs:		
Fuel	1,640	0.41
Containers	2,600	0.65
Cleaners & Filters	200	0.05
Miscellaneous	80	0.02
Total	4,520	1.13
Family and Hired Labour (408 hrs. @ $6/hr.)	2,448	0.61
Repairs - Building	230	0.06
- Equipment	760	0.19
R.O. Repairs & Filters	600	0.15
Interest on Operating Capital (4 mos. @ 10%)	285	0.07
Total Operating Costs	**8,843**	**2.21**
Overhead Costs:		
Hydro and Telephone	800	0.2
Insurance	537	0.13
Travel	520	0.13
Advertising	552	0.14
Association Fees	20	0.01
Miscellaneous	250	0.06
Total Overhead Costs	**2,679**	**0.67**
Ownership Costs:		
Amortization of Syrup Equipment (6.3%-15 yrs.)	5,731	1.43
Tap Rental	1,200	0.30
Total Ownership Costs	**6,931**	**1.73**
TOTAL COSTS (excluding operator labour and management)	**18,453**	**4.61**

Table 12:--Comparison of Maple Syrup Production Costs for 1,000, 2,000 and 4,000 Tap Operations, Ontario, 1987

	Size of Operation		
	1,000 Taps	2,000 Taps	4,000 Taps
	- dollars -		
Cost Item			
Fuel	1,930	3,860	4,520
Other Operating	1,145	1,834	4,323
Overhead	926	1,531	2,679
Investment	2,785	3,746	6,931
TOTAL COSTS (excluding operator labour and mgmt.)	6,786	10,971	18,453

Table 13:--Comparison of Maple Syrup Production Costs per Litre of Syrup Produced, 1,000, 2,000 and 4,000 Tap Operations, Ontario, 1987

	Size of Operation		
	1,000 Taps	2,000 Taps	4,000 Taps
	- dollars/litre -		
Cost Item			
Fuel	1.93	1.93	1.13
Other Operating	1.15	.92	1.08
Overhead	.92	.77	.67
Investment	2.79	1.87	1.73
TOTAL COSTS (excluding operator labour and mgmt.)	6.79	5.49	4.61

Table 14:--Net Returns to Operator Labour and Management in Maple Syrup Production, Varied by Size of Operation and Syrup Price, Ontario, 1987

Price per Litre of Syrup	Size of Operation		
	1,000 Taps	2,000 Taps	4,000 Taps
	- dollars per operation -		
10.00	3,214	9,029	21,547
9.00	2,214	7,029	17,547
8.00	1,214	5,029	13,547
7.00	214	3,029	9,547
6.00	-786	1,029	5,547
5.00	-1,786	-971	1,547

Table 15:--Net Returns per hour to Operator Labour in Maple Syrup Production, Varied by Size of Operation and Syrup Price, Ontario, 1987

	Size of Operation		
	1,000 Taps	2,000 Taps	4,000 Taps
Operator Labour Hours	205	400	500
Price per litre of Syrup:	- dollars per hour -		
10.00	13.24	19.92	39.09
9.00	8.61	15.17	31.49
8.00	3.97	10.42	23.89
7.00	-.66	5.67	16.29
6.00	-5.30	.92	8.69
5.00	-9.93	-3.82	1.09

Note: Labour hours established by consensus.

Table 16:--Effect of Maple Syrup Yield on Production Costs, Ontario, 1987

Yield, Litres per tap	0.6	0.8	1.0	1.2	1.4	1.6
	- cost per litre of syrup - dollars -					
Operating cost	3.08	3.08	3.08	3.08	3.08	3.08
Fixed cost	6.18	4.64	3.71	3.09	2.65	2.32
Total cost per litre (excluding operator labour & mgmt.)	9.26	7.72	6.79	6.17	5.73	5.40

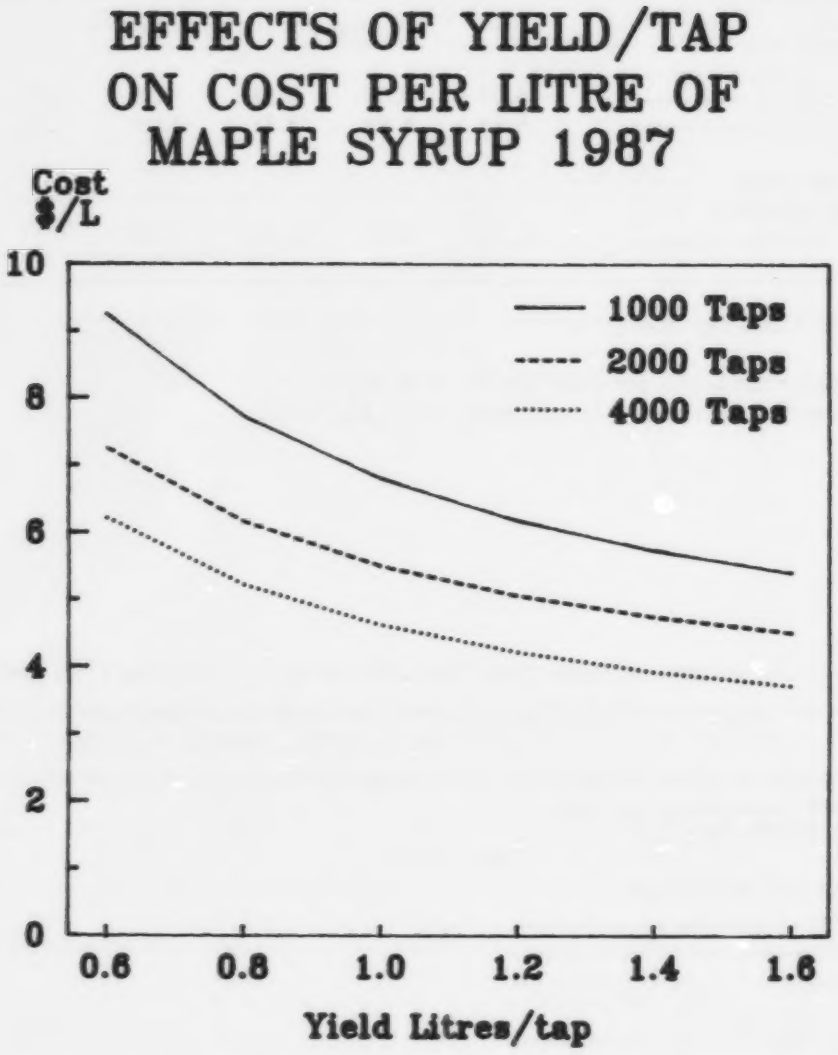
Assumption: 1,000 tap operation

1. Operating cost $3.08 per litre for all yield levels.
2. Fixed costs = overhead + investment cost = $3,711.00

Table 17:--Comparison of Production Costs, Maple Syrup, Ontario, 1978 and 1987

	1978	1987
Taps per Farm	2,359	2,000
Syrup Yield, Litres per Tap	.81	1.0
Labour hours per 1,000 Taps		
Production	300	252
Marketing	30	25
Total	330	277
Labour hours per litre of Syrup	.4	.28
	- dollars per litre -	
Production Costs		
Operating	1.40	2.85
Overhead	.08	.77
Ownership	1.18	1.87
Operator Labour	1.23	1.40
Total	3.89	6.89

Figure 2


EFFECTS OF YIELD/TAP
ON COST PER LITRE OF
MAPLE SYRUP 1987
Cost
$/L
10
8
6
4
2
0
1000 Taps
2000 Taps
4000 Taps
0.6
0.8
1.0
1.2
1.4
1.6
Yield Litres/tap

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